

NODE=B063

N(1535) 1/2⁻

$I(J^P) = \frac{1}{2}(\frac{1}{2}^-)$ Status: * * * *

Most of the results published before 1975 were last included in our 1982 edition, Physics Letters **111B** 1 (1982). Some further obsolete results published before 1984 were last included in our 2006 edition, Journal of Physics, G **33** 1 (2006).

NODE=B063

N(1535) BREIT-WIGNER MASS

NODE=B063M

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1525 to 1545 (\approx 1535) OUR ESTIMATE			
1519 \pm 5	ANISOVICH	12A	DPWA Multichannel
1547.0 \pm 0.7	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
1550 \pm 40	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
1526 \pm 7	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1538 \pm 1	SHRESTHA	12A	DPWA Multichannel
1535 \pm 20	ANISOVICH	10	DPWA Multichannel
1553 \pm 8	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
1548 \pm 15	THOMA	08	DPWA Multichannel
1546.7 \pm 2.2	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
1526 \pm 2	PENNER	02C	DPWA Multichannel
1530 \pm 10	BAI	01B	BES $J/\psi \rightarrow p\bar{p}\eta$
1522 \pm 11	THOMPSON	01	CLAS $\gamma^* p \rightarrow p\eta$
1542 \pm 3	VRANA	00	DPWA Multichannel
1532 \pm 5	ARMSTRONG	99B	DPWA $\gamma^* p \rightarrow p\eta$
1549.0 \pm 2.1	ABAEV	96	DPWA $\pi^- p \rightarrow \eta n$
1525 \pm 10	ARNDT	96	IPWA $\gamma N \rightarrow \pi N$
1535	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
1544 \pm 13	KRUSCHE	95	DPWA $\gamma p \rightarrow p\eta$
1518	LI	93	IPWA $\gamma N \rightarrow \pi N$
1534 \pm 7	MANLEY	92	IPWA $\pi N \rightarrow \pi N & N\pi\pi$
1520	¹ LONGACRE	77	IPWA $\pi N \rightarrow N\pi\pi$
1510	² LONGACRE	75	IPWA $\pi N \rightarrow N\pi\pi$

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N(1535) BREIT-WIGNER WIDTH

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VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
125 to 175 (\approx 150) OUR ESTIMATE			
128 \pm 14	ANISOVICH	12A	DPWA Multichannel
188.4 \pm 3.8	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
148.2 \pm 8.1	GREEN	97	DPWA $\pi N \rightarrow \pi N, \eta N$
240 \pm 80	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
120 \pm 20	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
141 \pm 4	SHRESTHA	12A	DPWA Multichannel
170 \pm 35	ANISOVICH	10	DPWA Multichannel
182 \pm 25	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
170 \pm 20	THOMA	08	DPWA Multichannel
178.0 \pm 11.6	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
129 \pm 8	PENNER	02C	DPWA Multichannel
95 \pm 25	BAI	01B	BES $J/\psi \rightarrow p\bar{p}\eta$
143 \pm 18	THOMPSON	01	CLAS $\gamma^* p \rightarrow p\eta$
112 \pm 19	VRANA	00	DPWA Multichannel
154 \pm 20	ARMSTRONG	99B	DPWA $\gamma^* p \rightarrow p\eta$
212 \pm 20	³ KRUSCHE	97	DPWA $\gamma N \rightarrow \eta N$
168.8 \pm 11.6	ABAEV	96	DPWA $\pi^- p \rightarrow \eta n$
103 \pm 5	ARNDT	96	IPWA $\gamma N \rightarrow \pi N$
66	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
200 \pm 40	KRUSCHE	95	DPWA $\gamma p \rightarrow p\eta$
84	LI	93	IPWA $\gamma N \rightarrow \pi N$
151 \pm 27	MANLEY	92	IPWA $\pi N \rightarrow \pi N & N\pi\pi$
135	¹ LONGACRE	77	IPWA $\pi N \rightarrow N\pi\pi$
100	² LONGACRE	75	IPWA $\pi N \rightarrow N\pi\pi$

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N(1535) POLE POSITION**REAL PART**

VALUE (MeV)

1490 to 1530 (\approx 1510) OUR ESTIMATE

	DOCUMENT ID	TECN	COMMENT
1501 \pm 4	ANISOVICH	12A	DPWA Multichannel
1502	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
1487	⁴ HOEHLER	93	SPED $\pi N \rightarrow \pi N$
1510 \pm 50	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$			
1515	SHRESTHA	12A	DPWA Multichannel
1510 \pm 25	ANISOVICH	10	DPWA Multichannel
1521 \pm 14	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
1508^{+10}_{-30}	THOMA	08	DPWA Multichannel
1526	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
1525	VRANA	00	DPWA Multichannel
1510 \pm 10	⁵ ARNDT	98	DPWA $\pi N \rightarrow \pi N, \eta N$
1501	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
1499	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ Soln SM90
1496 or 1499	⁶ LONGACRE	78	IPWA $\pi N \rightarrow N\pi\pi$
1525 or 1527	¹ LONGACRE	77	IPWA $\pi N \rightarrow N\pi\pi$

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→ UNCHECKED ←

-2xIMAGINARY PART

VALUE (MeV)

90 to 250 (\approx 170) OUR ESTIMATE

	DOCUMENT ID	TECN	COMMENT
134 \pm 11	ANISOVICH	12A	DPWA Multichannel
95	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
260 \pm 80	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$			
123	SHRESTHA	12A	DPWA Multichannel
140 \pm 30	ANISOVICH	10	DPWA Multichannel
190 \pm 28	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
165 \pm 15	THOMA	08	DPWA Multichannel
130	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
102	VRANA	00	DPWA Multichannel
170 \pm 30	⁵ ARNDT	98	DPWA $\pi N \rightarrow \pi N, \eta N$
124	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
110	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ Soln SM90
103 or 105	⁶ LONGACRE	78	IPWA $\pi N \rightarrow N\pi\pi$
135 or 123	¹ LONGACRE	77	IPWA $\pi N \rightarrow N\pi\pi$

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→ UNCHECKED ←

N(1535) ELASTIC POLE RESIDUE**MODULUS $|r|$**

VALUE (MeV)

50 \pm 20 OUR ESTIMATE

	DOCUMENT ID	TECN	COMMENT
31 \pm 4	ANISOVICH	12A	DPWA Multichannel
16	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
120 \pm 40	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$			
68	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
33	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
31	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
23	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ Soln SM90

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→ UNCHECKED ←

PHASE θ

VALUE (°)

-15 \pm 15 OUR ESTIMATE

	DOCUMENT ID	TECN	COMMENT
-29 \pm 5	ANISOVICH	12A	DPWA Multichannel
-16	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
+15 \pm 45	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$			
12	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
14	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
-12	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
-13	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ Soln SM90

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N(1535) INELASTIC POLE RESIDUE

The "normalized residue" is the residue divided by $\Gamma_{pole}/2$.

Normalized residue in $N\pi \rightarrow N(1535) \rightarrow N\eta$

MODULUS (%)	PHASE (°)	DOCUMENT ID	TECN	COMMENT
43±3	-76 ± 5	ANISOVICH	12A	DPWA Multichannel

Normalized residue in $N\pi \rightarrow N(1535) \rightarrow \Delta\pi, D\text{-wave}$

MODULUS (%)	PHASE (°)	DOCUMENT ID	TECN	COMMENT
12±3	145 ± 17	ANISOVICH	12A	DPWA Multichannel

N(1535) DECAY MODES

The following branching fractions are our estimates, not fits or averages.

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 N\pi$	35–55 %
$\Gamma_2 N\eta$	(42 ± 10) %
$\Gamma_3 N\pi\pi$	1–10 %
$\Gamma_4 \Delta\pi$	<1 %
$\Gamma_5 \Delta(1232)\pi, D\text{-wave}$	0–4 %
$\Gamma_6 N\rho$	<4 %
$\Gamma_7 N\rho, S=1/2, S\text{-wave}$	(2.0 ± 1.0) %
$\Gamma_8 N\rho, S=3/2, D\text{-wave}$	(0.0 ± 1.0) %
$\Gamma_9 N(\pi\pi)^{I=0}_{S\text{-wave}}$	(2 ± 1) %
$\Gamma_{10} N(1440)\pi$	(8 ± 3) %
$\Gamma_{11} p\gamma$	0.15–0.30 %
$\Gamma_{12} p\gamma, \text{ helicity}=1/2$	0.15–0.30 %
$\Gamma_{13} n\gamma$	0.01–0.25 %
$\Gamma_{14} n\gamma, \text{ helicity}=1/2$	0.01–0.25 %

N(1535) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$

35 to 55 OUR ESTIMATE

VALUE (%)	DOCUMENT ID	TECN	COMMENT
54 ± 5	ANISOVICH	12A	DPWA Multichannel
35.5 ± 0.2	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
39.4 ± 0.9	GREEN	97	DPWA $\pi N \rightarrow \pi N, \eta N$
50 ± 10	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
38 ± 4	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
37 ± 1	SHRESTHA	12A	DPWA Multichannel
35 ± 15	ANISOVICH	10	DPWA Multichannel
46 ± 7	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
37 ± 9	THOMA	08	DPWA Multichannel
36.0 ± 0.9	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
36 ± 1	PENNER	02C	DPWA Multichannel
35 ± 8	VRANA	00	DPWA Multichannel
33.0 ± 1.1	ABAEV	96	DPWA $\pi^- p \rightarrow \eta n$
31	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
51 ± 5	MANLEY	92	IPWA $\pi N \rightarrow \pi N \& N\pi\pi$

Γ_1/Γ

DESIG=1;OUR EST
 DESIG=2;OUR EST
 DESIG=4;OUR EST
 DESIG=181;OUR EST
 DESIG=5;OUR EST
 DESIG=182;OUR EST
 DESIG=6
 DESIG=7
 DESIG=8;OUR EST
 DESIG=11;OUR EST
 DESIG=184;OUR EST
 DESIG=9;OUR EST
 DESIG=185;OUR EST
 DESIG=10;OUR EST

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$\Gamma(N\eta)/\Gamma_{\text{total}}$

42 ± 10 OUR ESTIMATE

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
42 ± 10 OUR ESTIMATE				
33 ± 5		ANISOVICH	12A	DPWA Multichannel
53 ± 1		PENNER	02C	DPWA Multichannel
51 ± 5		VRANA	00	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
41 ± 2		SHRESTHA	12A	DPWA Multichannel
50 ± 7		BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
40 ± 10		THOMA	08	DPWA Multichannel
>45	95	7 ARMSTRONG	99B	DPWA $p(e,e'p)\eta$
56.8 ± 1.1		GREEN	97	DPWA $\pi N \rightarrow \pi N, \eta N$
59.1 ± 1.7		ABAEV	96	DPWA $\pi^- p \rightarrow \eta n$

Γ_2/Γ

NODE=B063R7
 NODE=B063R7
 → UNCHECKED ←

NODE=B063240

NODE=B063240

NODE=B063RS1
 NODE=B063RS1

NODE=B063RS2
 NODE=B063RS2

NODE=B063225;NODE=B063

NODE=B063

$\Gamma(N\eta)/\Gamma(N\pi)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_2/Γ_1
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.95±0.03	AZNAURYAN 09	CLAS	π, η electroproduction	NODE=B063R13 NODE=B063R13

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$(\Gamma_1\Gamma_f)^{1/2}/\Gamma_{\text{total}}$
+0.44 to +0.50 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
+0.47±0.02	MANLEY 92	IPWA	$\pi N \rightarrow \pi N & N\pi\pi$	NODE=B063R2 NODE=B063R2 → UNCHECKED ←

Note: Signs of couplings from $\pi N \rightarrow N\pi\pi$ analyses were changed in the 1986 edition to agree with the baryon-first convention; the overall phase ambiguity is resolved by choosing a negative sign for the $\Delta(1620) S_{31}$ coupling to $\Delta(1232)\pi$.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$(\Gamma_1\Gamma_5)^{1/2}/\Gamma$
-0.04 to +0.06 OUR ESTIMATE				
0.00	1 LONGACRE 77	IPWA	$\pi N \rightarrow N\pi\pi$	NODE=B063R3 NODE=B063R3 → UNCHECKED ←
+0.06	2 LONGACRE 75	IPWA	$\pi N \rightarrow N\pi\pi$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
+0.00±0.04	MANLEY 92	IPWA	$\pi N \rightarrow \pi N & N\pi\pi$	

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_5/Γ
0 to 4 OUR ESTIMATE				
2.5±1.5	ANISOVICH 12A	DPWA	Multichannel	NODE=B063R10 NODE=B063R10 → UNCHECKED ←
1 ±1	VRANA 00	DPWA	Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.8±0.8	SHRESTHA 12A	DPWA	Multichannel	
23 ±8	THOMA 08	DPWA	Multichannel	

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$(\Gamma_1\Gamma_7)^{1/2}/\Gamma$
-0.14 to -0.06 OUR ESTIMATE				
-0.10	1 LONGACRE 77	IPWA	$\pi N \rightarrow N\pi\pi$	NODE=B063R4 NODE=B063R4 → UNCHECKED ←
-0.09	2 LONGACRE 75	IPWA	$\pi N \rightarrow N\pi\pi$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.10±0.03	MANLEY 92	IPWA	$\pi N \rightarrow \pi N & N\pi\pi$	

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_7/Γ
2±1				
2 ±1	VRANA 00	DPWA	Multichannel	NODE=B063R8 NODE=B063R8
• • • We do not use the following data for averages, fits, limits, etc. • • •				
10±1	SHRESTHA 12A	DPWA	Multichannel	

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_8/Γ
0±1				
0±1	VRANA 00	DPWA	Multichannel	NODE=B063R9 NODE=B063R9
• • • We do not use the following data for averages, fits, limits, etc. • • •				
8±1	SHRESTHA 12A	DPWA	Multichannel	

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$(\Gamma_1\Gamma_9)^{1/2}/\Gamma$
+0.03 to +0.13 OUR ESTIMATE				
+0.08	1 LONGACRE 77	IPWA	$\pi N \rightarrow N\pi\pi$	NODE=B063R5 NODE=B063R5 → UNCHECKED ←
+0.09	2 LONGACRE 75	IPWA	$\pi N \rightarrow N\pi\pi$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
+0.07±0.04	MANLEY 92	IPWA	$\pi N \rightarrow \pi N & N\pi\pi$	

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_9/Γ
2 ±1				
2 ±1	VRANA 00	DPWA	Multichannel	NODE=B063R11 NODE=B063R11
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.5±0.5	SHRESTHA 12A	DPWA	Multichannel	

$(\Gamma_1 \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\pi \rightarrow N(1535) \rightarrow N(1440)\pi$	$(\Gamma_1 \Gamma_{10})^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
+0.10 ± 0.05	MANLEY 92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$
$\Gamma(N(1440)\pi)/\Gamma_{\text{total}}$			
VALUE (%)	DOCUMENT ID	TECN	COMMENT
8±3 OUR ESTIMATE			
8 ± 2	8 STAROSTIN 03	$\pi^- p \rightarrow n3\pi^0$	
10 ± 9	VRANA 00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
< 1	SHRESTHA 12A	DPWA	Multichannel

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$N(1535)$ PHOTON DECAY AMPLITUDES

Papers on γN amplitudes predating 1981 may be found in our 2006 edition, Journal of Physics, G **33** 1 (2006).

$N(1535) \rightarrow p\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE ($\text{GeV}^{-1/2}$)	DOCUMENT ID	TECN	COMMENT
+0.090±0.030 OUR ESTIMATE			
0.105 ± 0.010	ANISOVICH 12A	DPWA	Multichannel
0.128 ± 0.004	WORKMAN 12A	DPWA	$\gamma N \rightarrow N\pi$
0.091 ± 0.002	DUGGER 07	DPWA	$\gamma N \rightarrow \pi N$
0.120 ± 0.011 ± 0.015	3 KRUSCHE 97	DPWA	$\gamma N \rightarrow \eta N$
0.097 ± 0.006	BENMERROU..95	DPWA	$\gamma N \rightarrow N\eta$
0.095 ± 0.011	9 BENMERROU..91		$\gamma p \rightarrow p\eta$
0.053 ± 0.015	CRAWFORD 83	IPWA	$\gamma N \rightarrow \pi N$
0.077 ± 0.021	AWAJI 81	DPWA	$\gamma N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.059 ± 0.003	SHRESTHA 12A	DPWA	Multichannel
0.090 ± 0.015	ANISOVICH 10	DPWA	Multichannel
0.090 ± 0.025	10 ANISOVICH 09A	DPWA	$\gamma d \rightarrow \eta N(N)$
0.066	DRECHSEL 07	DPWA	$\gamma N \rightarrow \pi N$
0.090	PENNER 02D	DPWA	Multichannel
0.060 ± 0.015	ARNDT 96	IPWA	$\gamma N \rightarrow \pi N$
0.110 to 0.140	KRUSCHE 95	DPWA	$\gamma p \rightarrow p\eta$
0.125 ± 0.025	KRUSCHE 95c	IPWA	$\gamma d \rightarrow \eta N(N)$
0.061 ± 0.003	LI 93	IPWA	$\gamma N \rightarrow \pi N$
0.055	WADA 84	DPWA	Compton scattering

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$N(1535) \rightarrow n\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE ($\text{GeV}^{-1/2}$)	DOCUMENT ID	TECN	COMMENT
-0.046±0.027 OUR ESTIMATE			
-0.058 ± 0.006	CHEN 12A	DPWA	$\gamma N \rightarrow \pi N$
-0.080 ± 0.020	11 ANISOVICH 09A	DPWA	$\gamma d \rightarrow \eta N(N)$
0.035 ± 0.014	AWAJI 81	DPWA	$\gamma N \rightarrow \pi N$
-0.062 ± 0.003	FUJII 81	DPWA	$\gamma N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
-0.049 ± 0.003	SHRESTHA 12A	DPWA	Multichannel
-0.051	DRECHSEL 07	DPWA	$\gamma N \rightarrow \pi N$
-0.024	PENNER 02D	DPWA	Multichannel
-0.020 ± 0.035	ARNDT 96	IPWA	$\gamma N \rightarrow \pi N$
-0.100 ± 0.030	KRUSCHE 95c	IPWA	$\gamma d \rightarrow \eta N(N)$
-0.046 ± 0.005	LI 93	IPWA	$\gamma N \rightarrow \pi N$

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NODE=B063A2

→ UNCHECKED ←

$N(1535) \rightarrow N\gamma$, ratio $A_{1/2}^n/A_{1/2}^p$

VALUE ($\text{GeV}^{-1/2}$)	DOCUMENT ID	TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •		
-0.84 ± 0.15	MUKHOPAD... 95B	IPWA

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N(1535) FOOTNOTES

- ¹ LONGACRE 77 pole positions are from a search for poles in the unitarized T-matrix; the first (second) value uses, in addition to $\pi N \rightarrow N\pi\pi$ data, elastic amplitudes from a Saclay (CERN) partial-wave analysis. The other LONGACRE 77 values are from eyeball fits with Breit-Wigner circles to the T-matrix amplitudes.
- ² From method II of LONGACRE 75: eyeball fits with Breit-Wigner circles to the T-matrix amplitudes.
- ³ KRUSCHE 97 fits with the mass fixed at 1544 MeV.
- ⁴ See HOEHLER 93 for a detailed discussion of the evidence for and the pole parameters of N and Δ resonances as determined from Argand diagrams of πN elastic partial-wave amplitudes and from plots of the speeds with which the amplitudes traverse the diagrams.
- ⁵ ARNDT 98 also lists pole residues, which display more model dependence than do the associated pole positions.
- ⁶ LONGACRE 78 values are from a search for poles in the unitarized T-matrix. The first (second) value uses, in addition to $\pi N \rightarrow N\pi\pi$ data, elastic amplitudes from a Saclay (CERN) partial-wave analysis.
- ⁷ The best value ARMSTRONG 99B obtains is $\simeq 0.55$; this assumes S_{11} dominance in the reaction $p(e, e' p) \eta$ at $Q^2 = 4$ (GeV/c)².
- ⁸ This STAROSTIN 03 value is an estimate made using simplest assumptions.
- ⁹ BENMERROUCHE 91 uses an effective Lagrangian approach to analyze η photoproduction data.
- ¹⁰ This ANISOVICH 09A amplitude is evaluated at the pole position; the phase is $(20 \pm 15)^\circ$.
- ¹¹ This ANISOVICH 09A amplitude is evaluated at the pole position; the phase is $(20 \pm 20)^\circ$.

N(1535) REFERENCES

For early references, see Physics Letters **11B** 1 (1982).

ANISOVICH	12A	EPJ A48 15	A.V. Anisovich <i>et al.</i>	(BONN, PNPI)	REFID=54041
CHEN	12A	PR C86 015206	W. Chen <i>et al.</i>	(DUKE, GWU, MSST, ITEP+)	REFID=54337
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)	REFID=54862
WORKMAN	12A	PR C86 015202	R. Workman <i>et al.</i>	(GWU)	REFID=54335
ANISOVICH	10	EPJ A44 203	A.V. Anisovich <i>et al.</i>	(BONN, PNPI)	REFID=53280
BATINIC	10	PR C82 038203	M. Batinic <i>et al.</i>	(ZAGR)	REFID=53552
ANISOVICH	09A	EPJ A41 13	A.V. Anisovich <i>et al.</i>	(BONN, PNPI, BASL)	REFID=53011
AZNAURYAN	09	PR C80 055203	I.G. Aznauryan <i>et al.</i>	(JLAB CLAS Collab.)	REFID=53152
THOMA	08	PL B659 87	U. Thoma <i>et al.</i>	(CB-ELSA Collab.)	REFID=52087
DRECHSEL	07	EPJ A34 69	D. Drechsel, S.S. Kamalov, L. Tiator	(MAINZ, JINR)	REFID=52105
DUGGER	07	PR C76 025211	M. Dugger <i>et al.</i>	(Jefferson Lab CLAS Collab.)	REFID=52039
ARNDT	06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)	REFID=51535
PDG	06	JPG 33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.)	REFID=51004
ARNDT	04	PR C69 035213	R.A. Arndt <i>et al.</i>	(GWU, TRIU)	REFID=49947
STAROSTIN	03	PR C67 068201	A. Starostin <i>et al.</i>	(BNL Crystal Ball Collab.)	REFID=49429
PENNER	02C	PR C66 055211	G. Penner, U. Mosel	(GIES)	REFID=49129
PENNER	02D	PR C66 055212	G. Penner, U. Mosel	(GIES)	REFID=49130
BAI	01B	PL B510 75	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=48266
THOMPSON	01	PRC 86 1702	R. Thompson <i>et al.</i>	(Jefferson CLAS Collab.)	REFID=48083
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman, T.-S.H. Lee	(PITT+)	REFID=47593
ARMSTRONG	99B	PR D60 052004	C.S. Armstrong <i>et al.</i>		REFID=47206
ARNDT	98	PR C58 3636	R.A. Arndt <i>et al.</i>		REFID=46532
GREEN	97	PR C55 R2167	A.M. Green, S. Wycech	(HELS, WINR)	REFID=45462
KRUSCHE	97	PL B397 171	B. Krusche <i>et al.</i>	(GIES, RPI, SASK)	REFID=45318
ABAEV	96	PR C53 385	V.V. Abaev, B.M.K. Nefkens	(UCLA)	REFID=44674
ARNDT	96	PR C53 430	R.A. Arndt, I.I. Strakovsky, R.L. Workman	(VPI)	REFID=44675
ARNDT	95	PR C52 2120	R.A. Arndt <i>et al.</i>	(VPI, BRCO)	REFID=44535
BENMERROU...	95	PR D51 3237	M. Benmerrouche, N.C. Mukhopadhyay, J.F. Zhang		REFID=44218;ERROR=1
KRUSCHE	95	PRL 74 3736	B. Krusche <i>et al.</i>	(GIES, MANZ, GLAS+)	REFID=44204
KRUSCHE	95C	PL B358 40	B. Krusche <i>et al.</i>	(GIES, MANZ, GLAS+)	REFID=44572
MUKHOPAD...	95B	PL B364 1	N.C. Mukhopadhyay, J.F. Zhang, M. Benmerrouche		REFID=44580;ERROR=2
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)	REFID=43821
LI	93	PR C47 2759	Z.J. Li <i>et al.</i>	(VPI)	REFID=43327
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KSA) IJP	REFID=41535
Also		PR D30 904	D.M. Manley <i>et al.</i>	(VPI)	REFID=30071
ARNDT	91	PR D43 2131	R.A. Arndt <i>et al.</i>	(VPI, TELE) IJP	REFID=41467
BENMERROU..	91	PRL 67 1070	M. Benmerrouche, N.C. Mukhopadhyay	(RPI)	REFID=41607
WADA	84	NP B247 313	Y. Wada <i>et al.</i>	(INUS)	REFID=30072
CRAWFORD	83	NP B211 1	R.L. Crawford, W.T. Morton	(GLAS)	REFID=30070
PDG	82	PL 111B 1	M. Roos <i>et al.</i>	(HELS, CIT, CERN)	REFID=41167
AWAJI	81	Bonn Conf. 352	N. Awaji, R. Kajikawa	(NAGO)	REFID=30067
Also		NP B197 365	K. Fujii <i>et al.</i>	(NAGO)	REFID=30068
FUJII	81	NP B187 53	K. Fujii <i>et al.</i>	(NAGO, OSAK)	REFID=30069
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky <i>et al.</i>	(CMU, LBL) IJP	REFID=30064
Also		PR D20 2839	R.E. Cutkosky <i>et al.</i>	(CMU, LBL) IJP	REFID=40096
HOEHLER	79	PDAT 12-1	G. Hohler <i>et al.</i>	(KARLT) IJP	REFID=30058
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP	REFID=30859
LONGACRE	78	PR D17 1795	R.S. Longacre <i>et al.</i>	(LBL, SLAC)	REFID=30054
LONGACRE	77	NP B122 493	R.S. Longacre, J. Dolbeau	(SACL) IJP	REFID=30051
Also		NP B108 365	J. Dolbeau <i>et al.</i>	(SACL) IJP	REFID=30052
LONGACRE	75	PL 55B 415	R.S. Longacre <i>et al.</i>	(LBL, SLAC) IJP	REFID=30047

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